King County

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Recycled Asphalt

INTRODUCTION

Recycled Asphalt Pavement, or RAP, is commonly used as a component of new asphalt. Washington State Department of Transportation (WSDOT) allows the use of up to 20% RAP in new pavement.

Asphalt shingles can be processed into a ground product and used for road applications such as hot mix asphalt (HMA) pavement and cold patch. In King County, the Solid Waste Division estimates that 40,000 tons of asphalt shingle waste is disposed each year. While some shingles are being recycled, local end markets for the material are not well established. HMA paving is considered the highest and best end use for this material.

Currently 22 states allow the use of RAS in paving, which has previously been a significant barrier to recycling asphalt shingles from re-roofing projects locally.

REGULATIONS

Washington State Department of Transportation (WSDOT) Standard Specifications
HMA 5-04 Hot Mix Asphalt
5-04.2 Materials

The Contractor may choose to utilize recycled asphalt pavement (RAP) or reclaimed asphalt shingles (RAS) in the production of HMA. The RAP may be from pavements removed under the Contract, if any, or pavement material from an existing stockpile. The RAS may be from reclaimed shingles.

The Contractor may use up to 20 percent RAP by total weight of HMA with no additional sampling or testing of the RAP. If greater than 20 percent RAP by total weight of HMA or any amount of RAS is utilized in the production of HMA, the Contractor shall sample and test the RAP and RAS during stockpile construction in accordance with FOP for AASHTO T 308 for determination of asphalt binder content and FOP for WAQTC T 27/T 11 for gradation of the aggregates. The RAP shall be sampled and tested at a frequency of one sample for every 1,000 tons produced and not less than ten samples per project. The RAS shall be sampled and tested at a frequency of one sample for every 100 tons produced and not less than ten samples per project. The asphalt content and gradation test data shall be reported to the Contracting Agency when submitting the mix design for approval on the QPL. If utilized, the amount of RAS shall not exceed 5-percent of the total weight of the HMA. The Contractor shall include the RAP and RAS as part of the mix design as defined in these Specifications.

USAGE HISTORY AND EXPERIENCE

King County and their contractors routinely use up to 20% RAP in road paving.

In 2009, The King County LinkUp Program, Solid Waste Division worked with the King County Roads Services Division to do a Recycle Asphalt Shingles (RAS) in Roads demonstration project.

Post-consumer asphalt roofing shingles are valuable and represent a key waste diversion opportunity. It is becoming increasingly common throughout the United States to use RAS in Hot Mix Asphalt (HMA) pavements. King County Road Services Division's Materials Lab completed the third and final year of pavement performance testing on the Southeast 416th Street Shingles in Paving Demonstration Project — a controlled experimental study of the use of RAS in HMA conducted in partnership with the King County Solid Waste Division (SWD). Results showed that the pavement containing RAS is performing as well as the traditional pavement. King County Road Services Division is now developing updated specifications for use in its own projects.

Read the final report at: King County Road Services Division - SE 416th Street Shingles in Paving Demonstration final report and recommendations

In 2013, the SWD used nearly 10,000 tons of HMA containing three percent RAS at the new Bow Lake Recycling and Transfer Station. The SWD also maintains an asphalt work order contract, under which HMA containing RAS is used for all pavement work at its recycling and transfer stations and at the Cedar Hills Regional Landfill. In 2013, the first mix design for asphalt containing RAS approved under Washington State Department of Transportation's general special provisions (GSP) was used in pavement applied to a state highway in Edgewood, WA. The 20,000 tons of 1.5% RAS-HMA mix used in the project, developed by Miles Resources, represents 300 tons of asphalt shingles recycled.

King County RAS paving done in 2015 season

King County Road Services Division expanded its use of recycled asphalt shingles in 2015. They are using this material on roads paved as part of the county's HMA overlay program. Contractor Miles Resources used asphalt containing RAS to pave a total of 4.15 miles on sections of 276th Avenue Southeast and Southeast Auburn-Black Diamond Road. These roads have higher volumes of traffic than the road, on which Roads first tested the use of RAS between 2009 and 2012, indicating the agency's increasing confidence that the material performs well. The mix of materials for these roads, which totaled 10,170 tons, included 3 percent RAS and 15 percent reclaimed asphalt pavement. The amount of asphalt shingles diverted from landfills and used in the roads amounts to 305 tons.

Other projects:

City of Tacoma installs equipment for RAS use at asphalt plant, plans for shingles recycling

The City of Tacoma has completed an installation of equipment and plant retrofits needed at its municipally-owned asphalt facility to enable production of asphalt mixes containing RAS and RAP. With this new equipment, which was purchased with support from a grant from the Department of Ecology, the City is now producing asphalt containing 3% RAS and 10% RAP for use in City paving. And with new funding for paving recently passed by Tacoma voters, the City is poised to ramp up production of RAS-containing pavement in the coming years. Recycled shingles used in asphalt production at the plant are currently supplied by a contracted vendor but the City is exploring ways it can close the loop more directly and process shingles taken to the City-operated refuse facility. Tacoma's Plant Manager is also exploring options for successful deployment of warm mix production technology in combination with RAP and RAS to further reduce environmental impacts of asphalt production and increase cost savings for the City.

Lifecycle assessment of use of RAS in warm mix at NCAT test track
The results of a lifecycle assessment (LCA) of the energy and climate impacts of various asphalt mixes tested as part of the "Green Group" of the National Center for Asphalt Technology (NCAT) Test Track Fifth Cycle (2012-15) demonstrates that the use of RAS in paving can deliver significant environmental benefits. The Green Group Test Track included a section testing the use of RAS (5 percent of mix) and Reclaimed Asphalt Pavement in warm mix asphalt.

The LCA report, available here, concludes that using RAS and reclaimed asphalt pavement to replace virgin aggregates and binder in asphalt mixes can reduce both the energy consumed and CO2 produced during raw material extraction and processing. The use of recycled materials in a warm mix application can deliver additional energy savings and reduce CO2 production.

The performance results of the Green Group Test Track sections are expected to be published by the end of the year.

Seattle Public Utilities Paving with RAS at North Transfer Station

Seattle Public Utilities will use 5% recycled asphalt shingles (RAS) in the mix of approximately 2,000 tons of asphalt pavement being placed at its new North Transfer Station, which is currently under construction and scheduled to open in Spring 2016. The new transfer station replaces a facility that was built over 50 years ago to process all solid waste as garbage. Not only will the new transfer station separate multiple waste streams, including recyclables and green waste, it will also have used a variety of recycled materials, including RAS, in its construction.

BID AND CONTRACT LANGUAGE

2014 Recycled Asphalt Shingles Specification Guidelines - For Contracting Agencies specifying RAS to be used in Hot Mix Asphalt

2015 Solid Waste Division Work Order Services 2015

FOR MORE INFORMATION

Washington Asphalt Pavement Association Federal Highway Administration

Preliminary Investigation of RAP and RAS in HMAC: Final Report, Oregon Dept. of Transportation, 2010.

King County Asphalt Shingles projects and research

- Shingles in Paving Project
- Paving Demonstration
- King County Road Services Division - SE 416th Street Shingles in Paving Demonstration final report and recommendations
- Paving with Recycled Asphalt Shingles brochure (2014)

EPA Report: Analysis of Recycling of Asphalt Shingles in Pavement Mixes from a Life Cycle Perspective

VENDOR INFORMATION

List King County vendors:

- Miles Resources
- Northwest Asphalt